Role of Bovine MHC Genes in Resistance to Mastitis

Mario Lopez-Benavides and Jon GH Hickford
Animal and Food Sciences Division,
Lincoln University

Major Histocompatibility Complex (MHC) genes control immune responsiveness. They encode proteins that present pieces of foreign organisms to the immune system and control what the immune system does or does not "see." In all species studied, the genes are highly variable and this variation contributes to the differences between animals in immune responses to infectious agents.

Recent research in Canada (Sharif *et al.* 1998) and elsewhere (Dietz *et al.* 1997a, Dietz *et al.* 1997b, Weigel *et al.* 1990) has shown associations between the bovine MHC genes and somatic cell count (SCC) in cattle. These associations suggest that these genes are useful genetic markers of a higher or lower risk of mastitis in cows and therefore a means of addressing what is arguably the most important disease of dairy cattle worldwide.

Research at Lincoln University in the last nine years has been focussed on the MHC genes of sheep. We have acquired skills in typing the genes (Escayg *et al.* 1996) and have shown association between them and resistance to the bacterial hoof disease footrot (Escayg *et al.* 1997).

In this research we have used the MHC typing technologies we have developed for sheep, in dairy cattle. We have identified eleven alleles at the Bovine DQA2 locus to date, including two new sequences (Accession Numbers AF 388177 and AF388178). The segregation of these alleles has been assessed in large progeny groups derived from eight sires, covering two dairy breeds (Holstein-Friesian and Jersey). Preliminary evaluation reveals statistically significant differences in mean somatic cell count for the progeny groups and a link between particular alleles and increased or decreased somatic cell count in some sirelines.

References

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Workshop summary

- The genes for the immune system can be isolated in cows
- Can isolate genes that have resistance in varying degrees to mastitis
- Ultimately, want to come up with a gene test to select cows with mastitis resi~and